

CURTIN UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

CITECT SCADA PROGRAMMING

Objectives

1. Familiarize students with the configuration of Citect SCADA
2. Develop skills in creating HMI control pages and tagging

Equipment

CITECT V6

CITECT V6 Quick Start tutorial available on our web Blackboard

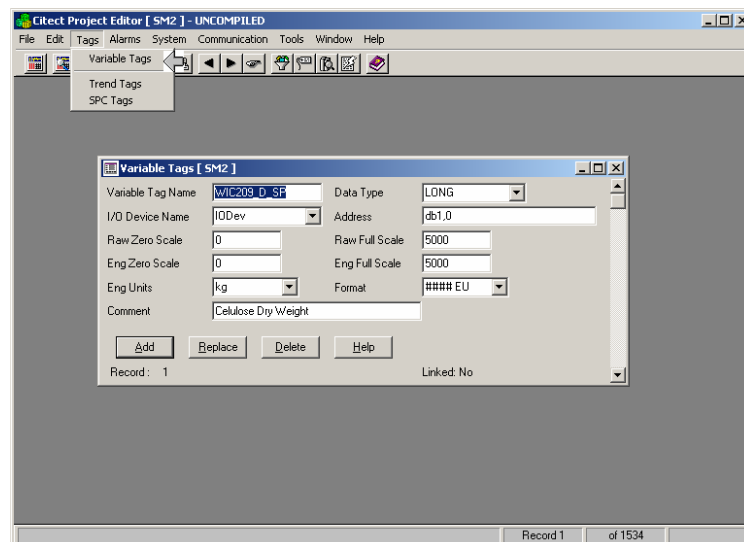
OMRON PLC Kit

OMRON user manual is provided on our web Blackboard

Procedure

First, familiarize yourselves with initial set up, network settings, new page development, compilation, tagging, etc as shown in the **Appendix**. If you are not familiar with Citect SCADA programming, you need to implement Citect QuickStart instructions first. This will take about 45 minutes.

a) Creating variable tags: Click on Tags > Variable Tags



Create the following Variable tags

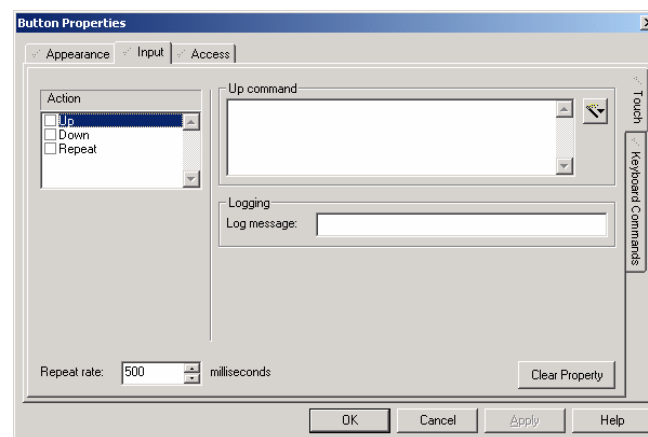
Tag Name	I/O Driver (device)	Data type	Address
RemStrStp	CJ1M	Digital	HR0.0
Enable	CJ1M	Digital	2960.0
FWD	CJ1M	Digital	HR0.1
REV	CJ1M	Digital	HR0.2
STOP	CJ1M	Digital	HR0.3
Run_F	CJ1M	Digital	2961.0
Run_R	CJ1M	Digital	2961.1

Press the **Add** Button to add each tag. The Record # on the bottom-left should increase every time you add a tag. Tag names can have letters, underscore, and number. Space and other symbols are not allowed.

b) Adding a Push Button and Cicode instruction to a screen:

From the **Graphics toolbox** select a **Button** and place it on the page (you need to click on the page and drag to **size the button**).

- Under **appearance** put the text you would like to show in the face of the Button.
- Under Input you can select: **action UP**, **action DOWN**, this will tell Citect to execute your Cicode-Script “written in the **Up Command** box” when the mouse button is either pressed, or released



c) Basic Cicode Instructions for buttons to control Bits

1. **Type** RemStrStp = 1 in the **UP Command Box** to turn the PLC bit H0.0 ON
2. **Type** RemStrStp = 0 in the **UP Command Box** to turn the PLC bit H0.0 OFF
3. **Type** Toggle(RemStrStp) in the **UP Command Box** to toggle bit H0.0 ON-OFF
4. **How to make a pulse button:** To make RemStrStp Pulse ON-OFF you will have to use RemStrStp = 1 on **Action Down** and RemStrStp = 0 on **Action Up**

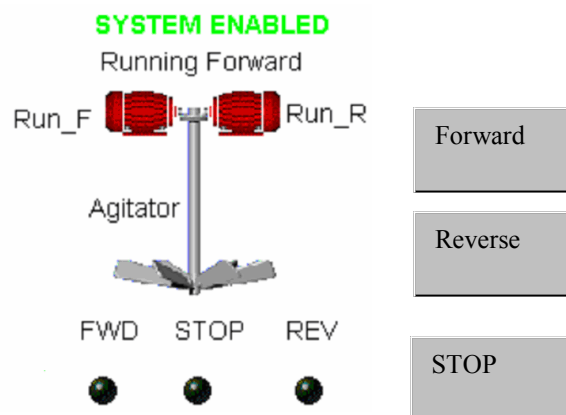
Exercise1: Insert a symbol-set to display the status of the Switch connected to Input 2960.0 (Tag = Enable). Run your project. Open-Close the switch and see the status on your Citect Page (NOTE: you must get this exercise correct to continue with the rest)

Exercise2 Add 3 Buttons to your page. Program button1 with the instruction RemStrStp = 1, button2 with the instruction RemStrStp = 0, and button3 with the instruction Toggle(RemStrStp). Put a Symbol Set indicator on the page to show the status of the RemStrStp Tag

- **The PLC must be set to MONITORING MODE:** From CX-Programmer go **Online**, then click on PLC>Operating Mode > Monitor
- Use H0.0 as part of your PLC program to control outputs 2961.0 as follows: If 2960.0=ON and H0.0=ON then 2961.0=ON (test your PLC and Citect programs)

Exercise4: Using CX-Programmer write a PLC program to start an agitator in forward or reverse direction. Use the addresses configured in Citect as part of your program. On your Citect page create a mimic of your system showing: An agitator, Two motors showing the state of the Run_F and Run_R outputs, Forward / reverse and stop buttons, the state on the Enable switch, and the state of the control bits FWD / REV and STOP. (Remember your PLC must be in monitor mode for Citect to control the Hx.x bits)

1. The enable switch must be ON for the agitator to run in any direction
2. The Forward, Reverse, and Stop Buttons are PULSE BUTTONS
3. The agitator must be stopped before changing direction.
4. The Agitator runs in forward if the Forward button pressed.
5. The Agitator runs in reverse if the Reverse button pressed.
6. The agitator picture should be grey when not running and Green when running
7. The Motor pictures should be red when not running and Green when running
8. The symbol-sets for Forward, reverse and Stop buttons should be Black=OFF and Green=ON



Appendix

SCADA

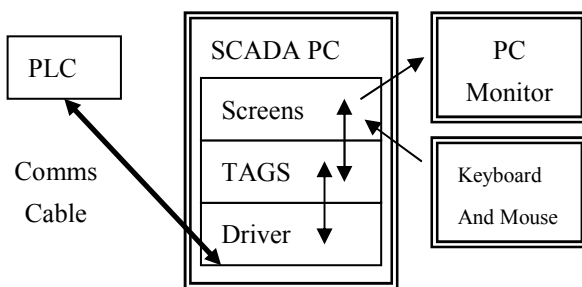
SCADA= Supervisory Control And Data Acquisition

SCADA software is used to monitor and control industrial processes. Citect is amongst of the most accepted SCADA software used in Australia.

The three basic components of a SCADA system are:

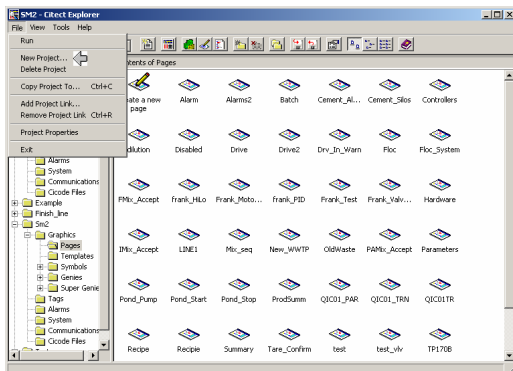
- A driver/protocol to communicate with the controlling device or PLC
- A Tag-database made of all variables to be monitored and/or controlled
- A graphics designing tool to create the control screens.

Schematic of a typical SCADA system



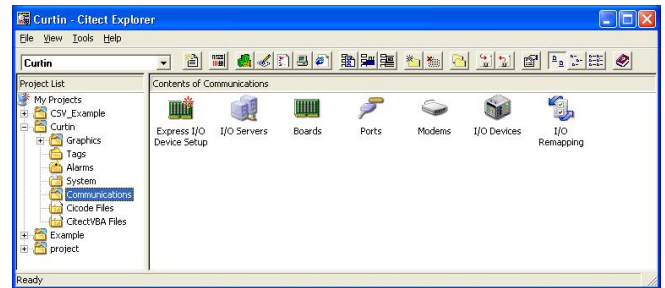
Basic steps to Configure a Citect Project

1. Start Citect Explorer from the START Bar. Citect Explorer is the main program used to create and modifying projects.
2. On the Tool Bar, Click on File>New Project. Name your project and press OK

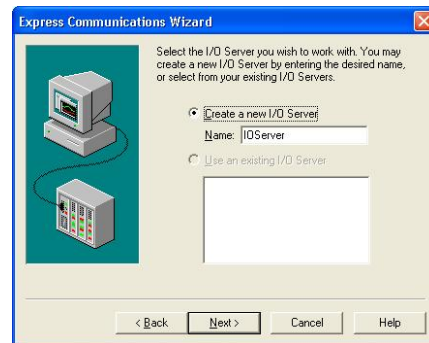


Configure an I/O Device (For Omron CJ1M)

1. Find the folder called **Communications** in your project
2. Double click on **Express I/O setup**; just press the **Next** button for the welcome window.



3. Enter a name for your I/O Server (Nickname for the computer you are using).



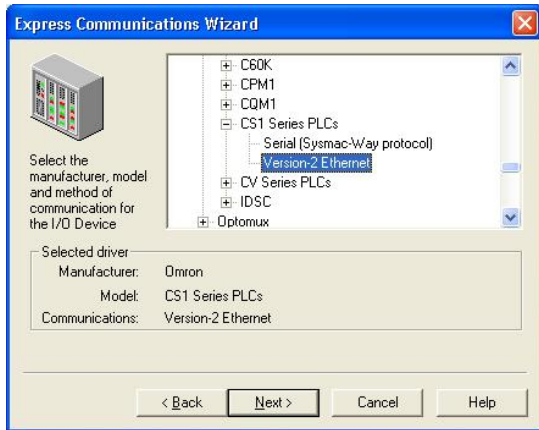
4. Enter a name for you I/O Device (Nickname for the PLC connected to your Computer). Use CJ1M as the I/O Device name



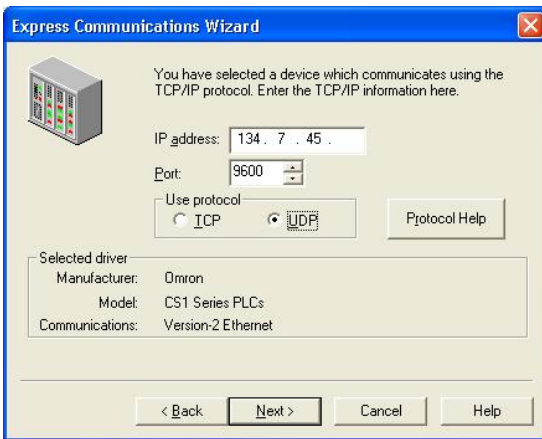
5. Choose External I/O Device. Explanation: External = Real PLC, Disk & Memory = PC Hard Disk (Internal TAGS or Simulation). If you choose External then the PC will try to establish connection to a real PLC via a communications port.



6. Find the Omron > CS1 series PLC > Version-2 Ethernet Driver.

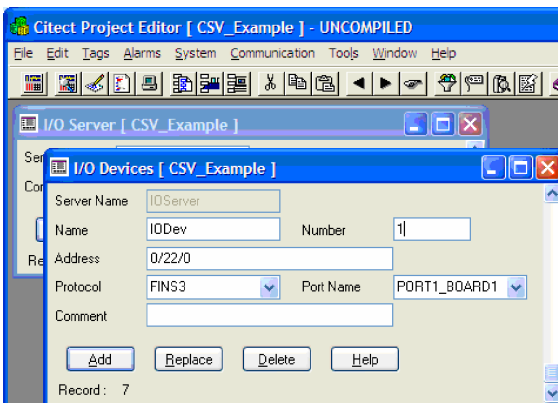
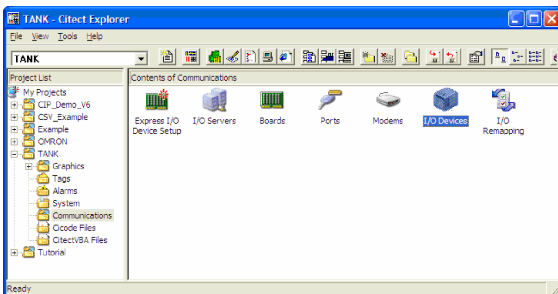


7. Enter your PLC IP Address, Port 9600, UDP

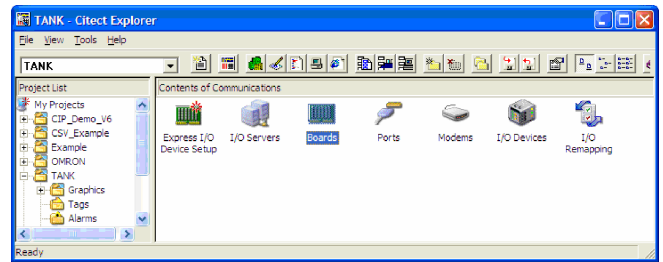


8. Click next, Click Next and Finish

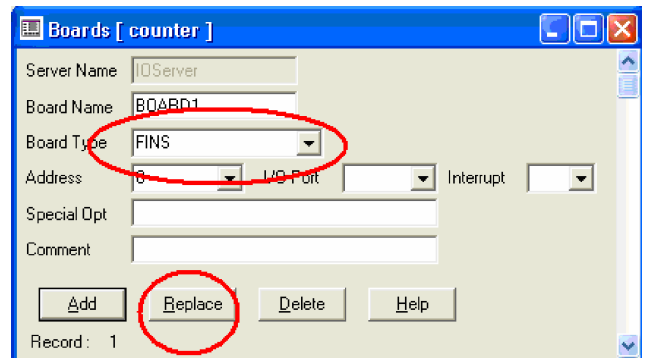
9. Double Click on I/O Devices



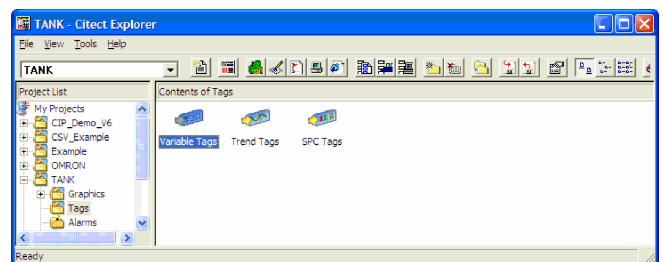
10. Go Back to the Citect Explorer window and double click on BOARDS



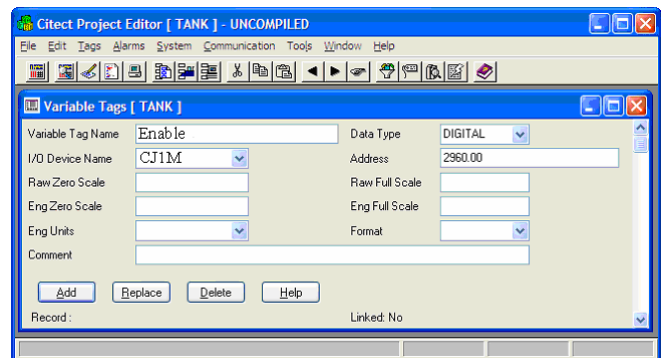
Here REPLACE board type with FINS



11. Creating a Test Variable Tag. From Citect Explorer go to Tags > Variable Tags



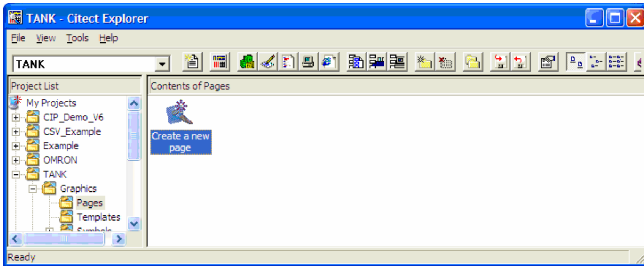
12. Type the following into form and click Add



For the address select the node number of the PLC
0/NODE/0 (for example plc with IP address 134.

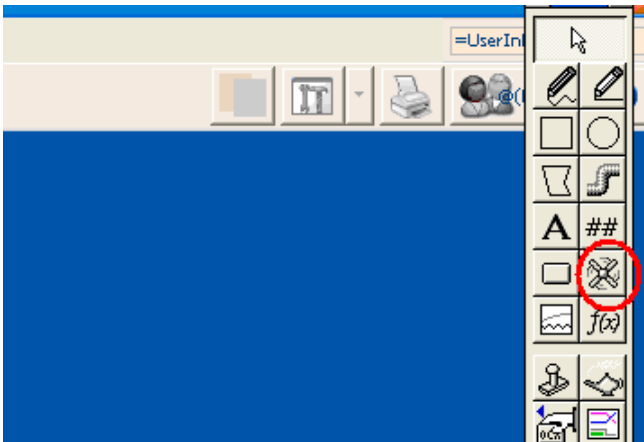
7.44.22 has a node address as 0/22/0). Then change the
protocol to FINS3 and PRESS REPLACE.

13. Creating a status display page. From Citect Explorer go to Graphics -> Pages -> Create a new page

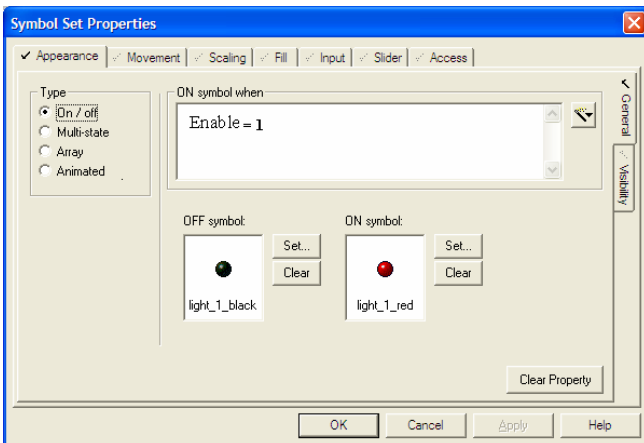


Select Normal page Then Press OK and save this page with the name Curtin in you project

14. Once the page is created click symbol set then click on your page



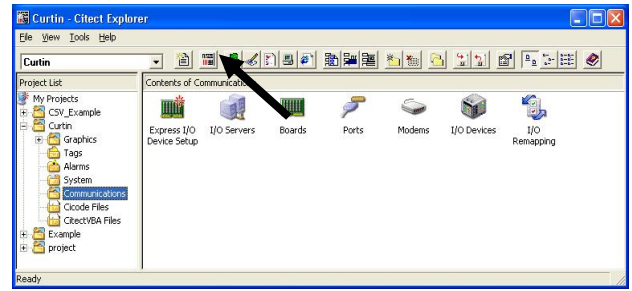
15. Enter Enable = 1 and Press OK



16. Press Save and Go back to Citect Explorer

Computer Setup

The last step before you can compile and run you project is to select the project you want to run. Click on the Citect Explorer Window then click on Tools > Computer Setup. Choose Express setup and click next. Choose Stand Alone Server and display Client (1st option) and Click next. From the Pull down list choose your project, then Click Next > Next > Finish. To Run your Project Click on the RUN button in the Citect Explorer Window



The Run Button is available in the Citect explorer window as well as in the Graphics builder and the Project Editor Window.

- Press OK when Citect reminds you that you will be running in demo mode.
- Press on the Left top corner and select Update Pages (If your Page is not listed There already)
- Press on the Left top corner and your Page

Project communications test

Your SCADA page should display the Symbol Set you crated using the graphics builder.

If you flick the switch 2960.0 ON you should see the Symbol Set changing color. If NOT, then you did something wrong during the setup. In such case you should start from the top again.